

**SCIENTIFIC COUNCIL MEETING – JUNE 2016****Spanish Research Report for 2015**

by

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Spanish catch information used in this Report is based on the logbook data contributed by the Spanish Administration. Table 1 presents the catches by species and Division in 2015 based on this information. The split of catches and effort between the different gears in this Report are based on information from NAFO observers on board. In 2015 NAFO observers information from 1,272 days was available while total effort of the Spanish fleet in NAFO Regulatory Area was 1,317 days (around 97% coverage).

In addition to NAFO observers, IEO scientific observers were on board 320 fishing days that it means 24 % of the Spanish total effort. All length, age and biological information presented in this paper is based on sampling carried out by IEO scientific observers: 576 samples were taken in 2015, with 59,883 individuals of different species examined (Table 2).

SUBAREA 3**A. Status of the fisheries**

A total of 12 Spanish trawlers operated in Div. 3LMNO NAFO Regulatory Area during 2015, amounting to 1,304 days (18,031 hours) of fishing effort. Table 3 presents the Spanish effort (fishing hours) since 2003 in NAFO Regulatory Area (NRA) Subarea 3. Total catches (Table 1) for all species combined in Div. 3LMNO were 15,336 tons in 2015.

Table 4 shows the effort (hours) by quarter, Division and their percentage by depth. Table 5 presents the percentage of the effort by Division, quarter and mesh size and Figure 1 shows the Spanish fleet footprint in 2015 based on the NAFO Observers information. Figure 1 show the directed hauls to each species. Directed hauls are when more than 50% of the total haul catches corresponds to that species.

These effort tables and figure show that the Spanish fleet carry out different directed fisheries in NAFO Subarea 3 characterized by different mesh size, target species, depth and fishing area. The Spanish fishery in NAFO Subarea 3 in 2015 has a similar patten described by Gonzalez-Costas (2012): Spanish fleet had the following fisheries in NAFO Division 3LMNO: 1) In Divisions 3LMNO at more than 600 meters depth with demersal 130 mm mesh size gear with Greenland halibut as target species. 2) In Divisions 3LMNO, mainly in Div 30 and 3M with demersal 130 mm mesh size gear in the 200-600 strata. The target species is the redfish. 3) In Divisions 3NO with 280 mm mesh size at less than 200 meters depth. The target species is the skates. 4) In Divisions 3NO with demersal 130 mm mesh size at depth less than 200 meters there is a mix fishery with different catch composition. 5) In Division 3M at depth between 150-550 meters targeting cod with 130 mm mesh size gear.

Effort and fisheries by Division were: in Div. 3L, most of the effort was performed at more than 600 meters depth using cod-end mesh size of 135 mm, indicating that the fleet targeted Greenland halibut. Regarding Div. 3M, the 48% of the effort was carried out using 135 mm cod-end mesh size at less than 600 m depth targeting redfish and cod and at depths more than 600 m (51%) targeting Greenland halibut. In Div. 3N, the effort carried out using 280 mm was the 60% and with 135 mm cod-end mesh size was 40%, which indicates that the fleet targeted mainly skate in depth less than 200 m. and Greenland halibut in depth more than 600 m. Fishing effort in Div. 3O was limited (19%) targeting skates using mainly 280 mm mesh size (38%) in depth less than 200 meters and redfish in depth between 200-600 meters using 135 mm mesh size (62%).

In addition to NAFO observers (NAFO Observers Program), 8 IEO scientific observers were onboard Spanish vessels, comprising a total of 320 observed fishing days, around 24% coverage of the total Spanish effort. Besides recording catches, discards and effort, these observers carried out biological sampling of the main species taken in the catch. For Greenland halibut, roughhead grenadier, American plaice and cod this includes recording weight at length, sex-ratio, maturity stages, performing stomach contents analyses and collecting material for reproductive studies. Otoliths of these four species were also taken for age determination. In 2015, 476 length samples were taken, with 59,883 individuals of different species examined to obtain the length distributions (Table 2). Length and age distributions presented in this paper are based on sampling carried out by these observers. Length-weight relationships parameters used to calculate the Sum Of Products (SOP) of the length distribution are shown by species in Table 6. These relationships were estimated based on the data collected in the European Union surveys information carried out in 2015 in the NAFO Regulatory Area (NRA).

The Spanish activity en the NRA Subarea 3 in 2015, stock by stock, was the following:

Cod

Div. 3NO: In Div. 3N, the most important part of the catches of this species were taken as by-catch in the skate fishery (62%) and in less degree in the redfish fishery (38%). In Div. 3O were taken the 44% of the Spanish catches of this stock and were by catch of the skate and redfish fisheries. Table 7 shows the catch length distribution for Div. 3NO cod. The bulk of the catches are comprised in the 32-78 cm range.

Div. 3M: Catches in Div. 3M were 2,100 tons and most of them were taken in the direct fishery. A small part was taken as by catch of the redfish fishery. The legal mesh size of the Cod fishery is 130 mm. In 2015 only trawlers operated in this fishery. The total length distributions of the Spanish catches are presented in Table 8 and we can observe that most of the catches are comprised in the range of 41-74 cm. The mode in 2015 was around 59 cm.

Redfish

3M: In Div. 3M the redfish catches in 2015 have been 1313 tons and most of them were catch in a direct fishery. The rest of the catches of this species was taken as by-catch in the cod fishery. Table 9 shows the Spanish catches length distribution for redfish Division 3M and it can be observed that the bulk of the catches are in the 22-37 cm range. This length distribution of catches in Div. 3M are bigger than the observed in Div 3O.

Div. 3LN: Spanish catches in 2015 were 178 tons. Most of the catches were taken in the reopened fishery for this stock. Table 10 shows the Spanish catches length distribution for redfish Division 3LN and it can be observed that the bulk of the catches are in the 21-29 cm range. This length distribution of catches in Div. 3LN is similar to the observed in Div. 3M and bigger than the observed in Div 3O.

Div. 3O: A directed fishery for this species took place in Div. 3O. Catches have reached 1713 tons in this Division, most of them with 130 mm mesh size. Catches length distribution for Div. 3O are presented in Table 11 and it can be observed that are smaller (19-25 cm) than the observed in Div. 3M and Div. 3LN.

American plaice

Div. 3LNO: Spanish catches in 2015 in Div. 3LNO were 271 tons. Most of the catches were taken with 280 mm mesh size (147 tons) as by-catch of the skate fishery and in less degree with 130 mm mesh size (124 tons). Length distributions with 280 mm mesh size have a bigger length range the 130 mm mesh size. Table 12

presents the total length distribution for Div. 3LNO. It can be observed a clear different length between sexes, males are smaller than females. The bulk of catches were in the range of 29-41 cm.

Div. 3M: Catches in Div. 3M only amounted 67 tons and most of them were taken as by-catch of the cod and redfish fisheries. In 2015 there are not available catches length distributions for this species in Divisions M.

Witch flounder

Div. 2J and 3KL: Spanish catches for this stock in 2015 were 10 tons and were taken in the small part of NAFO Regulatory Area (NRA) of Div. 3L as by catch of the Greenland halibut fishery. In 2015 there are not available catches length distributions for this species in Divisions 3L.

Div. 3M: This species in this Division was taken as by-catch in the Cod and redfish fishery. Catches this year were 110 tons and there is not management stock for this species in this Division. In 2015 there are not available catches length distributions for this species in Divisions 3M.

Div. 3NO: Spanish catches for this stock in 2015 were 93 tons. Most of the catches were taken as by-catch in the Redfish and Greenland halibut fisheries (94%) and in less degree in the skate fishery (6%). Table 13 shows the total Spanish length distribution for this species. The bulk of catches were in the range of 36-48 cm.

Yellowtail flounder

Div. 3LNO: In 2015 the yellowtail flounder Spanish catches were 333 tons. Most of the catches were taken in Div. 3NO in the skate fishery (237 tons) as by-catch. Catches in Div. 3L were only 6 tons taken with 130 mm mesh size gear. Length distributions for yellowtail flounder in Div. 3LNO are presented in Table 14. Most of the catches are in the 29-40 cm length range. Females are more abundant and bigger than males in the catches.

Greenland halibut

Subareas 2 and Div. 3KLMNO: Greenland halibut continues to be one of the main target species for the Spanish fleet in NAFO area. In 2015 Spanish catches were 4,308 tons; most of them have been taken in the Flemish Pass area (Div. 3LM) at depths more than 700 m. The mesh size used for this fishery was equal or greater than 130 mm. Tables 15 shows the length distributions of Spanish catches by Division (3L, 3M and 3NO) and the total length distributions of Spanish catches in Divisions 3LMNO. Most of the catches were in the 41-61 cm length range and the mode of the length distribution was in 50 cm. This length distribution is bigger than the 2013 where the mode was around 41 cm. Total age composition based in the commercial Spanish Age Length Key (Table 21), mean weight and mean length at age for Div. 3LMNO are presented in Table 16. Most of the Greenland halibut catches corresponds to ages 5 to 10 with a peak at ages 7. This age catch age distribution is similar to the last years.

Figure 2 presents the Spanish fleet standardised CPUE updated with the 2015 data presented by Gonzalez-Costas and Gonzalez-Troncoso (2009). Results show two different levels in the CPUE: one between 1992-2006 and other 2007-2015. In the last period the CPUE has been variable between years but the mean level of this period was higher than the period 1992-2006.

Thorny skate

Commercial catches of skates comprise a mix of skate species (*Raja radiata*, *Bathyraja spinicauda*, *Raja hyperborean*, *Raja senta*, etc). Thus the catch of skate in Table 1 refers to *Raja* spp. However, thorny skate dominates, comprising about 95% of the skate taken in the Spanish catches.

Div. 3LNO: Spanish skate catches in 2015 were 3,274 tons. Most of the catches were taken in Div. 3N at depths less than 200 meters, where a fishery directed to thorny skate took place using 280 mm mesh size. Skate catches in Div. 3L (9 tons) were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut fishery (130 mm cod-end). Table 17 shows the total catches length distributions by sex of Div. 3LNO, all catches length samples were with 280 mm mesh size and they were taken in Division 3NO. Most of the catches were in the 33-80 cm length range, similar to years before. It can be observed a clear different length between sexes, males are bigger than females.

Div. 3M: Skate catches in Div. 3M (35 tons) were much smaller than those in Div. 3NO and they were by-catch of the Greenland halibut, redfish and cod fisheries. There is not available catches length distributions for this species in Division 3M.

Roughhead grenadier

Subarea 2 and 3: Roughhead grenadier is the main species taken as by-catch in the Greenland halibut fishery. Most of the 2015 catches and most of the length distribution samples were taken in Div. 3LM. Individuals were measured from tip of snout to base of first anal-fin ray (AFL) to the half centimetre below. Spanish catches in 2015 were 73 tons. Table 18 shows the AFL length distributions, grouping in 1 cm intervals, of Spanish catches for Div. 3LMNO. Most of the catches were in the 12-25 AFL length range, with a mode in 17 cm and a clear length difference between sexes, males are smaller than females.

Age distributions based on the Spanish commercial and Flemish Cap (FC) survey Age Length Key (Table 22), mean weight and mean length (AFL) at age of the total catch for Div. 3LMNO are presented in Table 19. Most of the Roughhead grenadier catches in 2015 were based on ages 5 to 13 with a mode in 9-10 years old. This age distribution is quite similar to the observed in the last years.

White hake

Div. 3NO: Catches in 2015 were slightly higher than in previous years. Catches of this species in 2015 in Div. 3NO (121 tons) were a small by-catch of different fisheries. In Division 3NO part of the catches (13 tons) were taken with the 280 mesh size. Catches in Div. 3NO take with 130 mm mesh size (108 tons) are by-catch of the redfish fishery. Table 20 shows the total catches length distributions by sex of Div. 3NO. It was only available one length distribution sample for 280 mm mesh size with a small number of measured individuals. Due to this problem, this sample could not be very representative of the catches distributions. Most of the catches were in the 40-50 cm length range. In the catches, most of the individuals were females.

(B) Research studies

The Spanish bottom trawl survey in NAFO Regulatory Area Div. 3NO was conducted from 31 May to 19 June 2015 on board the R/V Vizconde de Eza. The gear was a Campelen otter trawl with 20 mm mesh size in the cod-end. A total of 122 valid hauls and 127 hydrographic stations were taken within a depth range of 45-1480 m according to a stratified random design. Furthermore, a stratified sampling by length class and sex was used to sample otoliths of Atlantic cod, American plaice and Greenland halibut for growth studies. Also, gonads of Atlantic cod and American plaice were sampled from histological maturity and fecundity studies. The results of this survey, including biomass indices with their errors and length distributions, as well as the calculated biomass based on conversion of length frequencies for Greenland halibut, American plaice, Atlantic cod, yellowtail flounder, redfish, witch flounder, roughhead grenadier, thorny skate and white hake are presented as Scientific Council Research Documents. In addition, age distributions are presented for Greenland halibut and Atlantic cod.

In 2003 it was decided to extend the Spanish 3NO survey toward Div. 3L (Flemish Pass). In 2015, the bottom trawl survey in Flemish Pass (Div. 3L) was carry out on board R/V Vizconde de Eza using the usual survey gear (Campelen 1800) from July 28th to August 17th. The area surveyed was Flemish Pass to depths up 800 fathoms (1463 m) following the same procedure as in previous years. The number of hauls was 104 and 7 of them were nulls. Survey results, including abundance indices and length distributions of the main commercial species, are presented as Scientific Council Research documents. Survey results for Div. 3LNO of the northern shrimp (*Pandalus borealis*) were presented in SCR 15/048.

Samples for histological (cod, American plaice, roughhead grenadier) and aging (Greenland halibut, American plaice, roughhead grenadier and cod) studies were taken. Feeding studies on demersal species were performed and 111 stomach contents were analysed in depths of 1045 to 1458 m. Eighty-nine hydrographic profile samplings were made in a depth range of 104-1395 m.

The EU bottom trawl survey in Flemish Cap (Div. 3M) was carried out on board R/V Vizconde de Eza using the usual survey gear (Lofoten) from June 22th to July 23th 2015. The area surveyed was Flemish Cap Bank to

depths up to 800 fathoms (1460 m) following the same procedure as in previous years. The number of hauls was 182 and one of them was null. Survey results including abundance indices of the main commercial species and age distributions for cod, redfish, American plaice, roughhead grenadier and Greenland halibut are presented as Scientific Council Research documents. Flemish Cap survey results for northern shrimp (*Pandalus borealis*) were presented in SCR 15/047. Samples for histological assessment of sexual maturity of cod, redfish, Greenland halibut and roughhead grenadier were taken. Oceanography studies continued to take place.

NEREIDA Project:

New data on deep-water corals and sponges were presented based on Spain and Portugal/EU bottom trawl groundfish surveys for 2015 and the Canadian multispecies surveys for 2013-2015. The data was made available to the NAFO WGESA to improve the mapping of sensitive species in the NAFO Regulatory area (Divs. 3LMNO).

“Significant” catches (according to the NAFO definition from groundfish surveys) of deep-water corals and sponges were provided and mapped together with the closed areas. A total number of 718 bottom trawl hauls surveys were analyzed. Distribution maps of presence and catches above threshold for RV data of sponges, large gorgonians, small gorgonians and sea pens following the thresholds were presented. For the Spain and Portugal/EU 2015 data:

Sponges were recorded in 233 of the total tows (57% of the total tows analyzed). For the Canadian 2013-2015 data, sponges were recorded in 159 of the total tows (51.3% of the total tows analyzed). Significant catches (≥ 75 kg/tow) were found in 13 EU tows and 2 CAD tows, located mainly in the Flemish Pass, Flemish Cap and slope of the Grand Bank. Of the total 15 tows, only 1 was recorded outside of the closed areas. Sponge catches for these tows ranged between 83.7 and 5053 kg.

Large gorgonians were recorded in 14 tows (3.2% of the total tows analyzed). For the Canadian 2013-2015 data, 10 tows were recorded (4.1% of the total tows analyzed). Significant catches (> 0.6 kg/tow) were found in 3 EU tows and 2 CAD tows, ranging in weights from 0.74-16.9kg. All significant catches, for the exception of 2, fall inside the actual closed areas.

Small gorgonians were recorded in 57 tows (14% of the total tows analyzed). For the Canadian 2013-2015 data, 9 tows were recorded (2.9% of the total tows analyzed). Significant catches (> 0.15 kg/tow) were recorded in 4 EU tows (1% of the total tows) and 1 CAD tow with one tow falling on the edge of the 30 closed area.

And sea pens were recorded in 147 tows (36 % of the total tows analyzed). For the Canadian 2013-2015 data, 16 tows were recorded (5.2% of the total tows analyzed). Significant catches (> 1.4 kg/tow) were found in 3 EU tows located outside closed areas.

Additionally, the reports “NEREIDA rock dredge sample analysis in support of VME Assessment and Protection in the NAFO Regulatory Area” and “NEREIDA sample analysis to assess the risk of Significant Adverse Impacts on VME in the NRA” were submitted to NAFO and EU in December 2015. On the one hand, these reports present the results produced from the analysis of rock dredge invertebrate fauna acquired during the NEREIDA survey programme around the Flemish Cap and the Tail of the Grand Banks of Newfoundland (NAFO Regulatory Area) and on the other hand, present the results produced in order to improve the accuracy of habitat suitability models applied to deep sea VME indicator taxa, by accounting for the effect of fishing in the predictions. Some results from these analyses have been published in a peer reviewed scientific journal.

SUBAREA 6

A. Status of the fisheries

Two Spanish trawlers operated during 2015 in Div. 6G NAFO Regulatory Area using a midwater trawl gear. The fishing effort of these trawlers was 13 days (92 hours). The most important species in catches was the *Beryx splendens* (Table 1).

There were not available Spanish catches length distribution in Division 6G in 2015.

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Table 1. Spanish Catches (tons) in NAFO Area in 2015 by species and Division, based on the Logbook data.

Code	English_name	Scientific_name	Provisional STATLANT 21A					Total
			3L	3M	3N	3O	6G	
GHL	Greenland halibut	<i>Reinhardtius hippoglossoides</i>	2550	1271	486	0		4308
SKA	Raja rays nei	<i>Raja spp</i>	9	35	2419	846		3309
RED	Atlantic redfishes nei	<i>Sebastes spp</i>	34	1313	144	1713		3203
COD	Atlantic cod	<i>Gadus morhua</i>	25	2100	107	82		2314
HKS	Silver hake	<i>Merluccius bilinearis</i>				494		494
PLA	American plaice	<i>Hippoglossoides platessoides</i>	32	67	140	99		337
YEL	Yellowtail flounder	<i>Limanda ferruginea</i>	6		223	103		333
WIT	Witch flounder	<i>Glyptocephalus cynoglossus</i>	10	110	13	80		213
HAD	Haddock	<i>Melanogrammus aeglefinus</i>		53	35	82		171
HKW	White hake	<i>Urophycis tenuis</i>		45	6	115		166
BYS	Splendid alfonsino	<i>Beryx splendens</i>					122	122
ANG	American angler	<i>Lophius americanus</i>			25	95		119
HAL	Atlantic halibut	<i>Hippoglossus hippoglossus</i>	3	7	44	53		107
RNG	Roundnose grenadier	<i>Coryphaenoides rupestris</i>	22	56	0			77
RHG	Roughhead grenadier	<i>Macrourus berglax</i>	17	43	13			72
CUX		<i>Holothuroidea</i>			50			50
CAT	Wolffishes(=Catfishes) nei	<i>Anarhichas spp</i>	11	12	7	1		30
DGX	Dogfish sharks nei	<i>Squalidae</i>	7	16	2			24
HKR	Red hake	<i>Urophycis chuss</i>	4	2	2	0		8
	Others		0	0	0	0	0	1
		Total tons	2728	5130	3715	3763	122	15458

Table 2. Samples and individuals sampled by the IEO Scientific Observers by species, mesh size and NAFO Division in 2015.

Code	Species	English_name	Catch/Disc.	Division	Mesh size	Samples	Ind.
CAA	<i>Anarhichas lupus</i>	Atlantic wolffish	C	3N	280 mm	1	10
ANT	<i>Antimora rostrata</i>	Blue antimora	C	3M	130 mm	1	100
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3L	130 mm	1	100
CFB	<i>Centroscyllium fabricii</i>	Black dogfish	C	3M	130 mm	1	100
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3L	130 mm	1	100
RNG	<i>Coryphaenoides rupestris</i>	Roundnose grenadier	C	3M	130 mm	6	542
COD	<i>Gadus morhua</i>	Cod	C	3M	130 mm	48	6149
COD	<i>Gadus morhua</i>	Cod	C	3M	130 mm	3	280
COD	<i>Gadus morhua</i>	Cod	C	3N	130 mm	3	246
COD	<i>Gadus morhua</i>	Cod	C	3N	280 mm	5	439
COD	<i>Gadus morhua</i>	Cod	D	3L	130 mm	1	133
COD	<i>Gadus morhua</i>	Cod	D	3M	130 mm	24	2926
COD	<i>Gadus morhua</i>	Cod	D	3N	130 mm	1	105
COD	<i>Gadus morhua</i>	Cod	D	3N	280 mm	1	110
GDE	<i>Gaidropsarus ensis</i>	Threadfin rockling	C	3L	130 mm	3	100
GDE	<i>Gaidropsarus ensis</i>	Threadfin rockling	C	3M	130 mm	1	10
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	130 mm	1	28
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3O	130 mm	2	316
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	C	3N	280 mm	1	67
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	D	3O	130 mm	1	118
WIT	<i>Glyptocephalus cynoglossus</i>	Witch flounder	D	3O	280 mm	1	50
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	130 mm	1	100
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	130 mm	16	2308
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3N	280 mm	13	1055
PLA	<i>Hippoglossoides platessoides</i>	American plaice	C	3O	280 mm	7	772
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3N	130 mm	1	78
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3O	130 mm	7	762
PLA	<i>Hippoglossoides platessoides</i>	American plaice	D	3N	280 mm	1	66
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	130 mm	1	100
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	C	3N	280 mm	15	1716
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	D	3N	130 mm	1	136
YEL	<i>Limanda ferruginea</i>	Yellowtail flounder	D	3N	280 mm	6	442
ANG	<i>Lophius americanus</i>	American angler	C	3O	280 mm	1	18

RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3L	130 mm	24	2893
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3M	130 mm	14	1611
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	C	3N	130 mm	1	171
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3L	130 mm	3	408
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3M	130 mm	1	44
RHG	<i>Macrourus berglax</i>	Roughhead grenadier	D	3N	130 mm	1	114
HKS	<i>Merluccius bilineares</i>	Silver hake	C	3O	130 mm	5	824
NZB	<i>Nezumia bairdi</i>	spike grenadier	C	3L	130 mm	1	58
NZB	<i>Nezumia bairdi</i>	spike grenadier	C	3M	130 mm	1	100
RJR	<i>Raja radiata</i>	Starry ray	C	3N	280 mm	27	3826
RJR	<i>Raja radiata</i>	Starry ray	C	3O	280 mm	6	876
RJR	<i>Raja radiata</i>	Starry ray	D	3O	130 mm	1	75
RJR	<i>Raja radiata</i>	Starry ray	D	3N	280 mm	5	322
RJR	<i>Raja radiata</i>	Starry ray	D	3O	280 mm	2	335
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3L	130 mm	104	14778
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3M	130 mm	24	3664
GHL	<i>Reinhardtius hippoglossoides</i>	Greenland halibut	C	3N	130 mm	4	578
RED	<i>Sebastes spp</i>	Redfish	C	3M	130 mm	19	1972
RED	<i>Sebastes spp</i>	Redfish	C	3L	130 mm	3	348
RED	<i>Sebastes spp</i>	Redfish	C	3M	130 mm	9	1437
RED	<i>Sebastes spp</i>	Redfish	C	3N	130 mm	3	299
RED	<i>Sebastes spp</i>	Redfish	C	3O	130 mm	19	3088
RED	<i>Sebastes spp</i>	Redfish	C	3O	280 mm	6	916
RED	<i>Sebastes spp</i>	Redfish	D	3M	130 mm	8	745
RED	<i>Sebastes spp</i>	Redfish	D	3L	130 mm	1	100
RED	<i>Sebastes spp</i>	Redfish	D	3M	130 mm	3	304
RED	<i>Sebastes spp</i>	Redfish	D	3O	280 mm	1	221
HKW	<i>Urophycis tenuis</i>	White hake	C	3M	130 mm	1	43
HKW	<i>Urophycis tenuis</i>	White hake	C	3O	280 mm	1	45
HKW	<i>Urophycis tenuis</i>	White hake	D	3O	130 mm	1	106

Table 3. Fishing effort (hours) of the Spanish fleet in Divisions 3LMNO by year based on the Logbook data.

3LMNO	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Effort (Hours)										25410	18602	18271	18031
	106821	76028	60128	44044	25163	21408	21250	22703	25276				

Table 4. Fishing effort (hours) of the Spanish fleet in 2015, by quarter, depth strata and Division, as well as percentage of effort by quarter and Division based on the NAFO Observers data.

Division	units	1st Q	2nd Q	3rd Q	4th Q	Total	% Div.
3L	<200					0%	
	200-600		5	17	2	0%	
	>600	2285	1404	891	273	100%	
	Total	2285	1409	908	275	4876	27%
3M	<200		8	5	32	1%	
	200-600	185	607	1265	36	48%	
	>600	1315	758	128		51%	
	Total	1501	1372	1397	68	4339	24%
3N	<200	158	924	1819	1148	74%	
	200-600	52	41	105	1	4%	
	>600	288	219	623	65	22%	
	Total	497	1184	2547	1215	5443	30%
3O	<200	585	995	499	206	68%	
	200-600	542	114	186	220	32%	
	>600	16	2		8	1%	
	Total	1143	1111	685	433	3373	19%
	Total						
		5426	5077	5538	1991	18031	100%
	%	30%	28%	31%	11%	100%	

Table 5. Percentage of the 2015 Spanish effort in SA 3 by mesh size, quarter and Division based on the NAFO Observers data.

Div.	Mesh Size	1st Q	2nd Q	3rd Q	4th Q	Total
3L	<90 mm					
	100-200 mm	100%	100%	100%	99%	100%
	>200 mm	0%	0%	0%	1%	0%
3M	<90 mm					
	100-200 mm	100%	100%	100%	100%	100%
	>200 mm	0%	0%	0%	0%	0%
3N	<90 mm					
	100-200 mm	75%	43%	48%	5%	40%
	>200 mm	25%	57%	52%	95%	60%
3O	<90 mm					
	100-200 mm	60%	60%	62%	73%	62%
	>200 mm	40%	40%	38%	27%	38%

Table 6. Parameters of the length-weight relationship ($W(g) = a \cdot L(cm)^b$) by species (2015).

Species	Source	a	b
Greenland halibut	FC Survey	0.0036	3.2162
Redfish 3O - 3LN	3NO Survey	0.0073	3.1798
Redfish 3M	FC Survey	0.0164	2.9879
Roughhead grenadier	FC Survey	0.1086	2.9130
Witch flounder	3NO Survey	0.0021	3.3160
American plaice	3NO Survey	0.0043	3.2033
Cod 3NO	3NO Survey	0.0051	3.1199
Cod 3M	FC Survey	0.0070	3.0614
Yellowtail Flounder	3NO Survey	0.0066	3.0784
Skate	3NO Survey	0.0109	2.9768
White Hake	3NO Survey	0.0021	3.3311

Table 7. Length distribution of 3NO Spanish Cod catches.

Cod	Division 3NO			
Length (cm)	Males	Females	Ind.	Total
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	428	0	428
28	397	611	0	1007
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	397	0	397
33	397	1190	0	1586
34	1190	1190	0	2379
35	397	793	0	1190
36	1366	1586	0	2952
37	2225	1251	0	3476
38	3013	2590	0	5603
39	3899	2545	0	6445
40	1661	1371	0	3032
41	2247	1824	0	4070
42	633	1454	0	2086
43	1540	1118	0	2659
44	2061	3912	0	5973
45	2555	3124	0	5679
46	1850	2554	0	4404
47	2544	1663	0	4208
48	1364	2423	0	3787
49	1912	2327	0	4239
50	1012	3120	0	4133
51	1057	1779	0	2836
52	1366	2336	0	3702
53	3427	1049	0	4476
54	1047	1938	0	2985
55	660	936	0	1596
56	942	3070	0	4013
57	1698	1432	0	3130
58	2624	1737	0	4361
59	2100	1232	0	3332
60	1145	817	0	1962
61	428	770	0	1198
62	573	852	0	1425
63	1023	820	0	1844
64	2191	2249	0	4441
65	450	1585	0	2035
66	379	1056	0	1436
67	450	298	0	748
68	1167	770	0	1937

69	2814	975	0	3788
70	337	2152	0	2489
71	1126	1179	0	2305
72	776	1790	0	2566
73	236	704	0	940
74	450	1085	0	1535
75	175	450	0	625
76	350	586	0	935
77	0	389	0	389
78	0	214	0	214
79	0	0	0	0
80	175	0	0	175
81	350	175	0	524
82	175	0	0	175
83	0	0	0	0
84	0	0	0	0
85	175	0	0	175
86	0	0	0	0
87	175	0	0	175
88	0	0	0	0
89	175	0	0	175
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	0	0	0
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
101	4	0	0	4
102	0	0	0	0
103	0	0	0	0
104	0	0	0	0
105	0	4	0	4
106	0	0	0	0
107	0	0	0	0
108	0	0	0	0
109	0	0	0	0
110	12	12	0	24
111	12	0	0	12
112	0	0	0	0
113	0	0	0	0
114	0	0	0	0
115	0	70	0	70
116	0	0	0	0
117	0	12	0	12
118	0	0	0	0

119	0	0	0	0
120	0	29	0	29
121	0	0	0	0
122	0	12	0	12
123	0	0	0	0
124	0	0	0	0
125	0	37	0	37
126	0	0	0	0
127	0	0	0	0
128	0	25	0	25
129	0	12	0	12
130	0	37	0	37
131	0	0	0	0
132	0	0	0	0
133	0	0	0	0
134	0	12	0	12
135	0	0	0	0
Total	62506	72162	0	134668

Samples	8
Ind. Sampled	685
Catch (ton)	190
SOP	1.00

Table 8. Length distribution of 3M Spanish Cod catches.

Cod Length (cm)	Division 3M			Total
	Males	Females	Ind.	
18	0	30	0	30
19	0	0	0	0
20	0	41	0	41
21	41	0	0	41
22	0	0	0	0
23	0	0	0	0
24	202	244	0	447
25	1172	4611	0	5783
26	4744	3084	0	7828
27	2261	3043	0	5303
28	8958	10045	0	19003
29	11726	11834	0	23561
30	9876	9439	0	19315
31	6986	5130	0	12115
32	2874	2713	0	5587
33	1255	1851	0	3106
34	0	1025	0	1025
35	2253	1490	0	3742
36	1453	1084	0	2537
37	3034	2760	0	5794
38	2818	3879	0	6697
39	3775	1275	0	5050
40	3150	3922	0	7072
41	8742	5987	0	14730
42	8757	7074	0	15831
43	7221	6811	0	14032
44	9767	6474	0	16241
45	10913	9424	0	20337
46	8539	10319	0	18857
47	10962	5001	0	15963
48	9036	10005	0	19041
49	10865	7434	0	18299
50	11748	9099	0	20847
51	13920	14473	0	28393
52	18643	11655	0	30298
53	15201	16333	0	31534
54	20663	16939	0	37602
55	29215	19915	0	49130
56	24268	26494	0	50762
57	23638	22409	0	46047
58	25084	24558	0	49642
59	25780	25099	0	50879
60	21909	24988	0	46896
61	23534	20324	0	43858

62	19020	23822	0	42842
63	16944	23907	0	40851
64	14220	19163	0	33383
65	11745	13951	0	25696
66	12302	10811	0	23113
67	9595	12674	0	22269
68	10217	11172	0	21389
69	7498	9119	0	16616
70	7484	7432	0	14917
71	5974	6226	0	12200
72	5556	6046	0	11602
73	5359	5421	0	10780
74	5075	6265	0	11340
75	3856	3493	0	7349
76	2489	4643	0	7131
77	1213	2043	0	3256
78	2037	3071	0	5108
79	1256	2595	0	3851
80	1930	2600	0	4529
81	677	1359	0	2037
82	685	2104	0	2789
83	1572	1539	0	3111
84	1730	2929	0	4659
85	2073	2054	55	4182
86	1313	745	0	2058
87	577	1627	0	2204
88	326	749	0	1075
89	527	1065	0	1592
90	1272	572	0	1844
91	556	1602	0	2157
92	762	362	0	1124
93	313	408	0	720
94	151	949	0	1100
95	556	1840	0	2397
96	697	567	0	1264
97	0	698	0	698
98	865	0	0	865
99	1577	743	0	2320
100	294	1696	0	1989
101	692	268	0	961
102	138	673	0	811
103	138	866	0	1004
104	569	409	0	978
105	111	655	0	766
106	215	139	0	354
107	215	284	0	499
108	0	28	0	28
109	0	503	0	503

110	0	377	0	377
111	84	137	0	221
112	0	189	0	189
113	0	0	0	0
114	0	55	0	55
115	55	55	0	111
116	138	0	0	138
117	0	0	0	0
118	0	55	0	55
Total	567629	571069	55	1138754

Samples	51
Ind. Sampled	6429
Catch (tons)	2100
SOP	0.93

Table 9. Redfish 3M stock Spanish catches length distribution.

Redfish Length (cm)	Males	Division 3M Females	Ind.	Total
13	1204	0	0	1204
14	0	0	0	0
15	1165	1204	0	2369
16	0	0	0	0
17	1232	6197	0	7429
18	2407	9311	0	11718
19	7828	8810	0	16639
20	19662	13219	0	32881
21	38094	39817	0	77911
22	64488	51415	0	115904
23	106647	61988	0	168635
24	166321	58406	0	224727
25	187830	59324	0	247153
26	200261	75275	0	275536
27	176820	131004	0	307824
28	115710	193785	0	309494
29	72676	206278	0	278954
30	30779	248105	0	278884
31	31484	145956	0	177439
32	25894	118060	0	143954
33	54508	74042	0	128550
34	58278	54140	0	112418
35	69375	40477	0	109852
36	61460	39310	0	100770
37	66079	31823	0	97901
38	48775	28642	0	77417
39	25750	32750	0	58500
40	14618	40068	0	54686
41	10374	27058	0	37432
42	3017	40607	0	43625
43	581	23112	0	23692
44	1032	14593	0	15624
45	164	12262	0	12426
46	65	5835	0	5900
47	0	6104	0	6104
48	0	635	0	635
49	0	1590	0	1590
50	0	0	0	0
51	0	1002	0	1002
Total	1664577	1902203	0	3566780
Samples				28
Ind. Sampled				3409
Catch (tons)				1313
SOP				0.80

Table 10. Redfish 3LN stock Spanish catches length distribution.

Redfish Length (cm)	Division 3LN			Total
	Males	Females	Ind.	
10	0	0	0	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	0	0
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	11010	3797	0	14807
21	26848	6326	0	33174
22	53628	29547	0	83174
23	44904	41210	0	86114
24	55747	43934	0	99680
25	57617	54961	0	112578
26	45062	41397	0	86459
27	19024	47761	0	66785
28	11973	74885	0	86858
29	2927	40406	0	43334
30	1291	22389	0	23680
31	694	10878	0	11572
32	1521	6391	0	7912
33	1828	3586	0	5413
34	863	3445	0	4308
35	1298	3393	0	4691
36	840	409	0	1249
37	844	196	0	1040
38	274	342	0	616
39	17	179	0	196
40	17	34	0	51
41	0	17	0	17
42	0	631	0	631
43	0	17	0	17
44	0	17	0	17
45	0	0	0	0
46	0	0	0	0
47	0	0	0	0
48	0	0	0	0
49	0	0	0	0
50	0	0	0	0
Total	338225	436148	0	774372
Samples				6
Ind. Sampled				647
Catch (tons)				178
SOP				0.96

Table 11. Redfish 30 stock Spanish catches length distribution.

Redfish Length (cm)	Males	Females	30 Ind.	Total
10	0	0	1113	1113
11	0	0	0	0
12	0	0	0	0
13	0	0	1113	1113
14	0	665	1113	1778
15	0	7046	0	7046
16	1416	708	1764	3888
17	31823	12463	984	45270
18	93187	66707	5740	165634
19	362405	180333	13319	556057
20	909701	354068	23153	1286921
21	1480144	805922	27029	2313095
22	1353236	1146978	23346	2523560
23	775574	1236463	9765	2021802
24	335361	1005185	6607	1347152
25	110943	569234	651	680828
26	48802	275807	651	325259
27	4379	139997	0	144376
28	1890	97478	0	99368
29	0	32441	0	32441
30	1919	13794	0	15712
31	0	11857	0	11857
32	0	1577	0	1577
33	0	2451	0	2451
34	0	0	15	15
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
Total	5510779	5961172	116362	11588313
Samples				25
Ind. Sampled				4004
Catch (tons)				1713
SOP				0.94

Table 12. American plaice 3LNO stock Spanish catches length distribution.

American Plaice	Division 3LNO			
Length (cm)	Males	Females	Ind.	Total
15	0	0	350	350
16	0	175	212	387
17	0	452	0	452
18	175	966	18	1159
19	166	5036	0	5201
20	4637	9580	0	14217
21	4648	4841	0	9489
22	0	21	0	21
23	0	5136	0	5136
24	13	4619	0	4632
25	480	438	0	918
26	15161	588	0	15749
27	7792	1562	0	9354
28	6994	1905	0	8899
29	19939	4176	0	24114
30	25128	7636	0	32765
31	24016	12056	0	36072
32	34187	18468	0	52654
33	34134	20696	0	54830
34	21861	27722	0	49583
35	11221	31919	0	43140
36	9992	41039	0	51031
37	8011	37918	0	45929
38	1209	30121	0	31330
39	1046	27083	0	28129
40	667	22125	0	22792
41	490	22956	0	23446
42	81	9205	0	9286
43	293	8472	0	8765
44	252	7960	0	8211
45	0	6557	0	6557
46	0	2768	0	2768
47	28	5237	0	5264
48	0	3107	0	3107
49	0	3988	0	3988
50	0	3891	0	3891
51	0	3637	0	3637
52	0	2316	0	2316
53	0	1907	0	1907
54	14	1961	0	1975
55	0	2421	0	2421
56	0	1156	0	1156
57	0	997	0	997
58	0	2046	0	2046
59	0	2787	0	2787
60	0	1071	0	1071

61	0	3125	0	3125
62	0	1094	0	1094
63	0	282	0	282
64	0	416	0	416
65	0	270	0	270
66	0	258	0	258
67	0	210	0	210
68	0	17	0	17
69	0	0	0	0
70	0	17	0	17
71	0	0	0	0
72	0	15	0	15
73	0	0	0	0
74	0	0	0	0
75	0	17	0	17
Total	232634	416439	580	649653

Samples	37
Ind. Sampled	4235
Catch (tons)	271
SOP	0.90

Table 13. Witch flounder Spanish catches length distribution for Div. 3NO.

Witch flounder	3NO			
Length (cm)	Males	Females	Ind.	Total
30	0	0	0	0
31	138	0	0	138
32	825	0	0	825
33	1420	0	0	1420
34	1145	688	0	1833
35	1580	2790	0	4370
36	4828	2790	0	7618
37	5605	1443	0	7048
38	4828	4828	0	9655
39	5839	4924	0	10764
40	5764	11461	0	17225
41	2877	10805	0	13682
42	2420	8692	0	11111
43	2070	7059	0	9128
44	1464	3440	0	4904
45	212	5913	0	6124
46	74	11706	0	11780
47	0	7781	0	7781
48	0	9511	0	9511
49	0	1636	0	1636
50	0	74	0	74
51	0	138	0	138
52	0	138	0	138
53	0	0	0	0
54	0	0	0	0
Total	41090	95813	0	136903
Samples				4
Ind. Sampled				411
Catch (tons)				93
SOP				1.31

Table 14. Yellowtail flounder Spanish catches length distribution for Div. 3LNO.

Yellowtail flounder Length (cm)	3LNO			Total
	Males	Females	Ind.	
18	0	0	66	66
19	0	132	0	132
20	100	50	0	150
21	4068	6101	71	10240
22	7314	4068	71	11453
23	5066	2385	0	7451
24	210	2415	0	2625
25	200	3033	0	3233
26	3066	3736	0	6802
27	14455	3798	0	18253
28	34933	774	0	35707
29	56918	9290	0	66208
30	77584	19438	0	97022
31	62237	28889	0	91126
32	64219	35646	0	99864
33	54411	42567	0	96977
34	37997	83659	0	121656
35	10198	73618	0	83816
36	6756	26864	0	33620
37	522	34888	0	35410
38	5202	66150	0	71352
39	250	46430	0	46680
40	16	60453	0	60468
41	16	30609	0	30624
42	172	12814	0	12986
43	31	2984	0	3015
44	71	5408	0	5480
45	0	3168	0	3168
46	0	51	0	51
47	0	66	0	66
48	0	163	0	163
49	0	121	0	121
50	0	0	0	0
51	0	16	0	16
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	0	0	0
56	0	0	0	0
57	0	61	0	61
58	0	0	0	0
59	0	61	0	61
60	0	0	0	0
61	0	0	0	0

62	0	0	0	0
63	0	0	0	0
64	0	0	0	0
65	0	61	0	61
Total	446011	609964	208	1056183
Samples				16
Ind. Sampled				1816
Catch (tons)				333
SOP				0.88

Table 15. Greenland halibut Spanish catches length distribution for Div. 3L and 3M.

Length (cm)	Division 3L					Division 3M			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
20	0	0	0	0		0	0	0	0
21	0	0	0	0		0	0	0	0
22	0	0	0	0		0	0	0	0
23	0	0	0	0		0	0	0	0
24	108	0	0	108		0	0	0	0
25	0	0	0	0		0	0	0	0
26	0	0	0	0		0	0	0	0
27	72	0	0	72		0	0	0	0
28	0	60	0	60		0	0	0	0
29	89	252	0	341		0	0	0	0
30	528	1262	133	1923		0	0	0	0
31	1857	2675	89	4622		0	0	0	0
32	1273	220	194	1687		0	0	0	0
33	1877	3493	0	5371		0	0	0	0
34	2592	5905	0	8498		0	289	0	289
35	6342	5912	0	12254		0	0	0	0
36	5645	3869	0	9514		0	0	168	168
37	6443	5219	565	12228		0	235	0	235
38	7059	9380	346	16785		0	0	660	660
39	12358	10871	1128	24357		0	351	2091	2442
40	15103	15749	1419	32271		0	623	1014	1637
41	17449	19090	2598	39136		96	289	1460	1845
42	24544	28829	4652	58026		1773	470	4243	6486
43	22869	37621	6185	66675		324	2462	3960	6746
44	31147	42004	7935	81086		1525	725	6068	8318
45	32453	49649	13600	95702		2738	6687	11500	20925
46	38872	66569	15869	121310		7904	9152	10590	27647
47	46307	84813	28063	159183		10935	18672	13248	42855
48	44274	93747	27199	165221		10267	24664	10256	45187
49	53049	109669	19139	181856		15559	40920	6734	63213
50	49374	126776	10630	186780		10919	43528	2545	56992
51	41362	141138	4946	187445		13041	50199	0	63240
52	34984	126264	2182	163430		12726	55195	0	67921
53	27507	110862	1677	140046		7595	50862	0	58458
54	20808	103015	1526	125349		7589	55413	0	63002
55	15854	94445	1212	111511		5331	52113	0	57444
56	10860	68178	1185	80223		4071	39634	0	43705
57	6495	73090	969	80554		2534	44561	0	47095
58	2955	53893	500	57348		1105	34690	0	35795
59	1957	48919	323	51200		1150	28008	0	29158
60	2548	30412	323	33283		1903	23239	0	25142
61	535	25784	215	26535		1762	18662	0	20424
62	404	17801	646	18852		263	15402	0	15665
63	103	14909	108	15119		0	12510	0	12510
64	219	10703	108	11029		351	7705	0	8056
65	106	9935	0	10040		898	8448	0	9346

66	0	4054	215	4270		0	5651	0	5651
67	0	5766	108	5874		351	5546	0	5897
68	0	3286	0	3286		0	3972	0	3972
69	0	4297	0	4297		0	3444	0	3444
70	0	1785	0	1785		0	4458	0	4458
71	0	1582	215	1797		0	3117	0	3117
72	0	1649	0	1649		0	2319	0	2319
73	0	2331	108	2439		0	1852	0	1852
74	0	1434	0	1434		0	2509	0	2509
75	0	1724	0	1724		0	1243	0	1243
76	0	778	0	778		0	1290	0	1290
77	0	325	0	325		0	1242	0	1242
78	0	257	0	257		0	1496	0	1496
79	0	161	0	161		0	641	0	641
80	0	222	0	222		0	125	0	125
81	0	335	0	335		0	343	0	343
82	0	452	0	452		0	96	0	96
83	0	19	0	19		0	211	0	211
84	0	62	0	62		0	125	0	125
85	0	501	0	501		0	0	0	0
86	0	19	0	19		0	0	0	0
87	0	0	0	0		0	0	0	0
88	0	0	0	0		0	263	0	263
89	0	0	0	0		0	0	0	0
90	0	0	0	0		0	0	0	0
91	0	0	0	0		0	0	0	0
92	0	0	0	0		0	0	0	0
93	0	112	0	112		0	0	0	0
94	0	0	0	0		0	0	0	0
95	0	0	0	0		0	0	0	0
96	0	0	0	0		0	0	0	0
97	0	97	0	97		0	0	0	0
98	0	0	0	0		0	0	0	0
99	0	0	0	0		0	0	0	0
100	0	0	0	0		0	0	0	0
Total	588379	1684232	156311	2428922		122713	685651	74535	882899
Samples				104					24
Ind. Sampled				14778					3664
Catch (tons)				2550					1271

Table 15 (cont.). Greenland halibut Spanish catches length distribution for Div. 3N and 3O.

Length (cm)	Division 3N					Division 3O			
	Males	Females	Ind.	Total		Males	Females	Ind.	Total
20	0	0	0	0					
21	0	0	0	0					
22	0	0	0	0					
23	0	0	0	0					
24	0	0	0	0					
25	0	0	0	0					
26	0	948	0	948					
27	0	0	0	0					
28	948	0	0	948					
29	0	0	0	0					
30	948	0	0	948					
31	0	948	0	948					
32	0	1971	0	1971					
33	151	0	0	151					
34	1023	4650	0	5674					
35	948	2799	0	3747					
36	151	3747	0	3898					
37	0	4650	0	4650					
38	1023	316	0	1339					
39	2843	1023	0	3866					
40	6590	2002	0	8592					
41	4289	4396	0	8685					
42	6653	4093	0	10745					
43	1174	22681	0	23855					
44	10429	13546	0	23975					
45	4694	14206	0	18901					
46	2197	16103	0	18300					
47	5040	23657	0	28697					
48	9736	34477	0	44214					
49	4726	42455	0	47181					
50	5749	34147	0	39896					
51	1023	40257	0	41281					
52	2799	15332	0	18131					
53	2799	16178	0	18977					
54	2318	18235	0	20553					
55	5357	16986	0	22344					
56	1655	18491	0	20146					
57	0	2287	0	2287					
58	0	9976	0	9976					
59	0	4649	0	4649					
60	0	7809	0	7809					
61	0	3506	0	3506					
62	0	4694	0	4694					
63	0	2243	0	2243					
64	0	0	0	0					
65	316	316	0	631					
66	0	151	0	151					

67	0	1895	0	1895	
68	0	0	0	0	
69	0	75	0	75	
70	0	0	0	0	
71	0	0	0	0	
72	0	0	0	0	
73	0	0	0	0	
74	0	0	0	0	
75	0	0	0	0	
76	0	0	0	0	
77	0	0	0	0	
78	0	0	0	0	
79	0	0	0	0	
80	0	0	0	0	
81	0	0	0	0	
82	0	0	0	0	
83	0	0	0	0	
84	0	0	0	0	
85	0	948	0	948	
86	0	0	0	0	
87	0	0	0	0	
88	0	0	0	0	
89	0	0	0	0	
90	0	0	0	0	
91	0	0	0	0	
92	0	0	0	0	
93	0	0	0	0	
94	0	0	0	0	
95	0	0	0	0	
96	0	0	0	0	
97	0	0	0	0	
98	0	0	0	0	
99	0	0	0	0	
100	0	0	0	0	
Total	85579	396845	0	482423	
Samples				4	
Ind Sampled				578	
Catch (tons)				486	0

Table 15 (cont.). Greenland halibut Spanish catches length distribution for Div. 3LMNO.

Length (cm)	Division 3LMNO			
	Males	Females	Indter.	Total
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	108	0	0	108
25	0	0	0	0
26	0	948	0	948
27	72	0	0	72
28	948	60	0	1008
29	89	252	0	341
30	1476	1262	133	2870
31	1857	3623	89	5569
32	1273	2191	194	3658
33	2028	3493	0	5521
34	3615	10845	0	14460
35	7290	8711	0	16000
36	5796	7616	168	13579
37	6443	10105	565	17113
38	8082	9696	1006	18784
39	15201	12246	3218	30665
40	21693	18375	2433	42501
41	21834	23775	4057	49666
42	32970	33392	8895	75257
43	24367	62764	10145	97276
44	43101	56275	14003	113378
45	39886	70542	25100	135528
46	48974	91824	26459	167257
47	62282	127142	41311	230735
48	64277	152889	37454	254621
49	73333	193043	25873	292250
50	66042	204450	13175	283668
51	55426	231594	4946	291966
52	50508	196792	2182	249482
53	37901	177903	1677	217481
54	30715	176663	1526	208904
55	26543	163544	1212	191299
56	16586	126303	1185	144074
57	9029	119937	969	129936
58	4060	98559	500	103119
59	3107	81576	323	85007
60	4451	61460	323	66234
61	2298	47952	215	50465
62	668	37898	646	39212
63	103	29661	108	29872
64	570	18408	108	19086
65	1319	18698	0	20017
66	0	9856	215	10072

67	351	13207	108	13666
68	0	7258	0	7258
69	0	7816	0	7816
70	0	6242	0	6242
71	0	4698	215	4914
72	0	3968	0	3968
73	0	4183	108	4291
74	0	3943	0	3943
75	0	2967	0	2967
76	0	2068	0	2068
77	0	1567	0	1567
78	0	1752	0	1752
79	0	802	0	802
80	0	347	0	347
81	0	678	0	678
82	0	548	0	548
83	0	230	0	230
84	0	187	0	187
85	0	1449	0	1449
86	0	19	0	19
87	0	0	0	0
88	0	263	0	263
89	0	0	0	0
90	0	0	0	0
91	0	0	0	0
92	0	0	0	0
93	0	112	0	112
94	0	0	0	0
95	0	0	0	0
96	0	0	0	0
97	0	97	0	97
98	0	0	0	0
99	0	0	0	0
100	0	0	0	0
Total	796670	2766728	230846	3794244

Samples	132
Ind Sampled	19020
Catch (tons)	4307
SOP	0.95

Table 16. Greenland halibut Subarea 2 Div. 3LMNO stock Spanish catches age distribution, mean weight (g) and mean length (cm) by age.

Abundance					Mean Weight (g)				
Age	Males	Females	Ind.	Total	Age	Males	Females	Ind.	Total
1	0	0	0	0	1				
2	108	0	0	108	2	102			102
3	2529	2123	101	4753	3	251	183	275	221
4	9020	15719	598	25337	4	296	301	349	300
5	108255	123728	23070	255053	5	569	551	649	568
6	336394	585711	139459	1061563	6	837	850	830	843
7	271664	1136571	60116	1468351	7	1157	1194	1001	1180
8	47207	433238	4366	484811	8	1405	1442	1337	1437
9	13147	165369	1080	179596	9	1644	1723	1695	1717
10	6676	164476	1081	172234	10	1996	1975	2030	1977
11	0	52861	444	53304	11		2296	2317	2296
12	1670	34177	253	36101	12	2529	2632	2749	2628
13	0	26508	111	26619	13		2913	3051	2913
14	0	12831	72	12903	14		3512	3442	3512
15	0	9490	84	9574	15		3754	3420	3751
16	0	639	12	651	16		4490	3288	4468
17	0	1995	0	1995	17		5281		5281
18	0	537	0	537	18		5813		5813
19	0	544	0	544	19		5942		5942
20	0	209	0	209	20		8368		8368
Mean Length (cm)									
Age	Males	Females	Ind.	Total					
1									
2	24.5			24.5					
3	31.8	29.1	33.0	30.6					
4	33.8	33.9	35.3	33.9					
5	41.3	40.8	43.1	41.2					
6	46.7	46.9	46.6	46.8					
7	51.7	52.2	49.4	52.0					
8	54.9	55.3	54.0	55.3					
9	57.6	58.5	58.2	58.4					
10	61.3	61.0	61.5	61.0					
11		63.9	64.1	63.9					
12	65.9	66.6	67.5	66.6					
13		68.7	69.7	68.7					
14		72.8	72.5	72.8					
15		74.3	72.4	74.3					
16		78.2	71.5	78.0					
17		82.7		82.7					
18		85.2		85.2					
19		85.8		85.8					
20		95.4		95.4					

Table 17. Skates Spanish catches length distribution by sex for Div. 3LNO.

Skates Length (cm)	3LNO			Total
	Males	Females	Ind.	
20	0	0	0	0
21	0	0	0	0
22	643	426	0	1069
23	0	0	0	0
24	0	108	0	108
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	4077	172	0	4249
29	8154	9598	0	17752
30	6421	5028	0	11449
31	5247	5058	0	10306
32	9307	9340	0	18647
33	10227	12317	0	22544
34	6722	1992	0	8713
35	15757	15369	0	31125
36	12623	8222	0	20845
37	28532	11034	0	39567
38	13911	31495	0	45406
39	15329	14418	0	29747
40	17864	43253	0	61117
41	17231	18932	0	36163
42	31248	12424	0	43672
43	39978	17476	0	57454
44	36185	35300	0	71485
45	22522	32733	0	55255
46	19290	36921	0	56211
47	16355	25072	0	41427
48	22567	20347	0	42913
49	37650	19278	0	56928
50	22699	16994	0	39693
51	16272	11930	0	28202
52	15540	14742	0	30283
53	19529	16862	0	36391
54	18885	21638	0	40523
55	29523	18484	0	48007
56	32530	13921	0	46451
57	22242	14465	0	36707
58	26337	10893	0	37230
59	20149	13138	0	33287
60	16430	27904	0	44334
61	13732	33256	0	46988
62	15183	10594	0	25777
63	10524	9739	0	20264
64	12591	11064	0	23655
65	10138	10431	0	20568
66	11439	11279	0	22718

67	11564	8341	0	19905
68	15516	20263	0	35778
69	15862	18512	0	34374
70	31113	24923	0	56036
71	13994	17598	0	31592
72	15209	4624	0	19833
73	10662	16654	0	27316
74	14357	3942	0	18299
75	15397	4506	0	19903
76	11140	6183	0	17323
77	18959	4185	0	23143
78	6717	3416	0	10133
79	26562	3739	0	30301
80	8701	2540	0	11241
81	15806	132	0	15937
82	4211	1152	0	5362
83	2253	571	0	2824
84	8753	2852	0	11605
85	3699	2982	0	6680
86	2529	0	0	2529
87	2324	0	0	2324
88	4584	0	0	4584
89	660	0	0	660
90	6285	132	0	6416
91	209	0	0	209
92	316	0	0	316
93	89	57	0	145
94	0	0	0	0
95	0	0	0	0
96	0	68	0	68
Total	979052	801016	0	1780068

Samples	33
Ind. Sampled	4702
Catch (ton)	3274
SOP	0.96

Table 18. Roughhead grenadier Spanish catches length distribution measured as preanal fin lengths (AFL) for Divisions 3LMNO.

Roughhead G. Length (cm)	3LMNO			Total
	Males	Females	Ind.	
5	0	0	15	15
6	0	0	0	0
7	135	135	26	296
8	1469	261	0	1730
9	2002	1989	636	4627
10	1390	1245	7	2643
11	777	172	0	949
12	4560	513	634	5707
13	2582	1242	0	3824
14	4528	2529	2	7059
15	4968	2860	57	7885
16	3597	2946	634	7177
17	5721	4815	2	10538
18	4371	4482	0	8852
19	4283	3174	0	7457
20	2116	3557	0	5673
21	923	4617	25	5565
22	533	3289	0	3822
23	50	4474	0	4524
24	0	4377	0	4377
25	0	4309	0	4309
26	25	3363	0	3388
27	0	2830	0	2830
28	0	1449	0	1449
29	0	1633	0	1633
30	0	1130	0	1130
31	0	602	0	602
32	0	117	0	117
33	0	158	0	158
34	0	71	0	71
35	0	138	6	144
36	0	37	0	37
37	0	0	0	0
38	0	15	0	15
39	0	0	0	0
40	0	0	0	0
Total	44031	62515	2045	108591
Samples				39
Ind. Sampled				4675
Catch (tons)				73
SOP				0.99

Table 19. Roughhead grenadier Div. 3LMNO Spanish catches distribution, mean weight (g) and mean length (AFL cm) by age.

[illegible]

Table 20. White hake Spanish catches length distribution by sex for Div. 3NO.

White hake Length (cm)	Males	3NO Females	Ind.	Total
20	0	0	0	0
21	0	0	0	0
22	0	0	0	0
23	0	0	0	0
24	0	0	0	0
25	0	0	0	0
26	0	0	0	0
27	0	0	0	0
28	0	0	0	0
29	0	0	0	0
30	0	0	0	0
31	0	0	0	0
32	0	0	0	0
33	0	0	0	0
34	0	0	0	0
35	0	0	0	0
36	0	0	0	0
37	0	0	0	0
38	0	0	0	0
39	0	0	0	0
40	0	0	0	0
41	1196	0	0	1196
42	2393	8375	0	10768
43	1196	4786	0	5982
44	1196	2393	0	3589
45	1196	2393	0	3589
46	2393	0	0	2393
47	1196	0	0	1196
48	0	0	0	0
49	1196	0	0	1196
50	2393	0	0	2393
51	1196	0	0	1196
52	0	0	0	0
53	0	0	0	0
54	0	0	0	0
55	0	1196	0	1196
56	0	1196	0	1196
57	0	1196	0	1196
58	0	1196	0	1196
59	0	0	0	0
60	0	1196	0	1196
61	0	2393	0	2393
62	0	1196	0	1196
63	0	0	0	0
64	0	0	0	0
65	0	0	0	0
66	0	0	0	0

67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	0	0	0	0
72	0	0	0	0
73	0	0	0	0
74	0	0	0	0
75	0	0	0	0
76	0	0	0	0
77	0	0	0	0
78	0	0	0	0
79	0	0	0	0
80	0	2393	0	2393
81	0	0	0	0
82	0	0	0	0
83	0	0	0	0
84	0	0	0	0
85	0	0	0	0
86	0	0	0	0
87	0	3589	0	3589
88	0	2393	0	2393
89	0	1196	0	1196
90	0	1196	0	1196
91	0	0	0	0
92	0	0	0	0
93	0	0	0	0
94	0	0	0	0
95	0	0	0	0
Total	15554	38287	0	53842

Samples	1
Ind. Sampled	45
Catch (ton)	121
SOP	1.37

Table 21. Greenland halibut Spanish 2014 catches total Age Length key (ALK).

Total	Age																			
Length	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Total
25																				0
26		1																		1
27		1																		1
28		3																		3
29		2																		2
30		2	5																	7
31			4																	4
32		2	7	1																10
33			4	3																7
34			8	6																14
35				10																10
36			1	11	2															14
37		1		20	2															23
38			1	13	2															16
39			1	19	7															27
40			1	18	10															29
41				19	18															37
42				19	23															42
43				11	29															40
44				10	40															50
45				5	45	2														52
46				4	51	5														60
47				2	49	13														64
48				1	29	26														56
49					33	36														69
50					16	32	5													53
51					6	57	1													64
52					3	53	7													63
53					1	37	19	1												58
54						41	21	1												63
55						30	26	3												59
56						17	21	7	1											46
57						15	19	13	2											49
58						5	20	18	7	1										51
59						1	11	16	13											41
60							1	12	15											28
61								5	21	6	1									33
62								2	14	7	1									24
63									15	7	2									24
64									6	5	4	2								17
65									1	1	7	5	1							15
66									3	6	5	1								15
67									1	5	4	2								12
68										1	3	5	2							11
69										1	2	4		2						9
70											4	5	2	1						12
71										1	5	4	3	4	1					18
72										1	1	2	1							5
73											1	1	2	2						6
74												4	3	1						8
75											1	1	2	1						5
76												2	1							3
77												1	1	1						3
78													1	2		1				4
79												1	2	2						5
80														2	1		1			4
81															1	3				4
82														1						1
83																2				2
84																1		1		2
85																2	1	1		4
86															1					1
87															1		1	1		3
88																				0
89																				0
90																				0
91																				0
92																			1	1
93																				0
94																				0
95																				0
96																			1	1
97																				0
98																				0
99																				0
100																				0
Total	0	12	32	172	366	370	151	78	99	42	41	36	23	21	5	9	3	3	2	1465

Table 21 (Cont.). Greenland halibut Spanish 2014 catches males Age Length key (ALK).

Males		Age																			Total
Length	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
25																				0	
26																				0	
27																				0	
28		2																		2	
29		1																		1	
30		1	2																	3	
31			2																	2	
32		1	4	1																6	
33			1	1																2	
34			5	3																8	
35				6																6	
36			1	3	1															5	
37		1		7	1															9	
38			1	8																9	
39				9	6															15	
40				7	3															10	
41				8	8															16	
42				7	9															16	
43				7	11															18	
44				5	15															20	
45					18	1														19	
46				4	18	1														23	
47				2	22	5														29	
48					17	8														25	
49					19	15														34	
50					8	15	1													24	
51					5	20														25	
52					1	20	1													22	
53					1	14	6													21	
54						13	6	1												20	
55						11	5	1												17	
56						4	5	1												10	
57						3	4	4												11	
58						2	5	3	1											11	
59							2	4	1											7	
60								1	1											2	
61									4											4	
62									1											1	
63									1											1	
64									1											1	
65										1										1	
66										1										1	
67										1										1	
68																				0	
69																				0	
70																				0	
71														1						1	
72																				0	
73																				0	
74																				0	
75																				0	
76																				0	
77																				0	
78																				0	
79																				0	
80																				0	
81																				0	
82																				0	
83																				0	
84																				0	
85																				0	
86																				0	
87																				0	
88																				0	
89																				0	
90																				0	
91																				0	
92																				0	
93																				0	
94																				0	
95																				0	
96																				0	
97																				0	
98																				0	
99																				0	
100																				0	
Total	0	6	16	78	163	132	35	15	10	0	3	0	0	1	0	0	0	0	0	459	

Table 21 (Cont.). Greenland halibut Spanish 2014 catches females Age Length key (ALK).

Females		Age																			Total
Length	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
25																				0	
26		1																		1	
27		1																		1	
28		1																		1	
29		1																		1	
30		1	3																	4	
31			2																	2	
32		1	3																	4	
33			3	2																5	
34			3	3																6	
35				4																4	
36				8	1															9	
37				13	1															14	
38				5	2															7	
39			1	10	1															12	
40			1	11	7															19	
41				11	10															21	
42				12	14															26	
43				4	18															22	
44				5	25															30	
45				5	27	1														33	
46					33	4														37	
47					27	8														35	
48				1	12	18														31	
49					14	21														35	
50					8	17	4													29	
51					1	37	1													39	
52					2	33	6													41	
53						23	13	1												37	
54						28	15													43	
55						19	21	2												42	
56						13	16	6	1											36	
57						12	15	9	2											38	
58						3	15	15	6	1										40	
59						1	9	12	12											34	
60							1	11	14											26	
61								5	17	6	1									29	
62								2	13	7	1									23	
63									14	7	2									23	
64									5	5	4	2								16	
65									1	1	6	5	1							14	
66									3	6	4	1								14	
67									1	5	3	2								11	
68										1	3	5	2							11	
69										1	2	4		2						9	
70											4	5	2	1						12	
71										1	5	4	3	3	1					17	
72										1	1		2	1						5	
73											1	1	2	2						6	
74												4	3	1						8	
75											1	1	2	1						5	
76													2	1						3	
77												1	1	1						3	
78													1	2		1				4	
79												1	2	2			1			5	
80														2	1		1			4	
81															1	3				4	
82														1						1	
83																2				2	
84																1		1		2	
85																2		1		4	
86															1					1	
87															1		1	1		3	
88																				0	
89																				0	
90																				0	
91																				0	
92																			1	1	
93																				0	
94																				0	
95																				0	
96																			1	1	
97																				0	
98																				0	
99																				0	
100																				0	
Total	0	6	16	94	203	238	116	63	89	42	38	36	23	20	5	9	3	3	1	1006	

Table 22. Roughhead grenadier Spanish 2015 Commercial and FC Total Age Length key (ALK).

AFL Length_cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	23	Total
3	7																					7
4	1	3																				4
5		10																				10
6		14	1																			15
7		6	5																			11
8			16	6																		22
9			9	4																		13
10			2	7	3																	12
11				10	3																	13
12				1	11	2																14
13					6	6	5															17
14						8	7	2														17
15						7	11	4														22
16							9	12	3	1												25
17								11	20	4	1											36
18								7	15	8												30
19									10	25	2	1										38
20									5	25	14	3										47
21									3	20	14	6	1									44
22									1	5	18	11	3	1								39
23										2	16	13	8	3								42
24											4	10	12		2							28
25												7	12	3	1	1						24
26												1	8	5	2	1						17
27												1	5	3	6	1						16
28													3	10	2	2						17
29													2	3	4	1	2					12
30															1	1	1	4				7
31																5	3	2				10
32															4	1	1	1	1			8
33																	2	2	1			5
34																	1		2	1		4
35																				1		1
36																				1		1
37																				1	1	2
38																					1	1
Total	8	33	33	28	23	23	32	36	57	90	69	53	54	28	22	13	10	9	4	4	2	631

Table 22 (Cont.). Roughhead grenadier Spanish 2015 Commercial and FC males Age Length key (ALK).

AFL Length_cm	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
3	1															1
4		2														2
5		4														4
6		9														9
7		4	1													5
8			10	4												14
9			3	3												6
10				3	3											6
11				5	2											7
12				1	6	1										8
13					2	5	3									10
14						4	4	1								9
15						4	8	2								14
16							4	7	1	1						13
17								5	10	4	1					20
18								3	9	7						19
19									8	12	2					22
20										6	7	2				15
21										4	6	4	1			15
22										1	1	1	2	1		6
23												1	2			3
24												1			1	2
Total	1	19	14	16	13	14	19	18	28	35	17	9	5	1	1	210

Table 22 (Cont.) Roughhead grenadier Spanish 2015 Commercial and FC females Age Length key (ALK).

AFL Length_cm	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	23	Total
4	1																				1
5	2																				2
6	5	1																			6
7	2	4																			6
8		6	2																		8
9		6	1																		7
10		2	4																		6
11			5	1																	6
12				5	1																6
13				4	1	2															7
14					4	3	1														8
15					3	3	2														8
16						5	5	2													12
17							6	10													16
18							4	6	1												11
19								2	13		1										16
20								5	19	7	1										32
21								3	16	8	2										29
22								1	4	17	10	1									33
23									2	16	12	6	3								39
24										4	9	12		1							26
25											7	12	3	1	1						24
26											1	8	5	2	1						17
27											1	5	3	6	1						16
28												3	10	2	2						17
29												2	3	4	1	2					12
30														1	1	1	4				7
31															5	3	2				10
32														4	1	1	1	1			8
33																2	2	1			5
34																1		2	1		4
35																			1		1
36																			1		1
37																			1	1	2
38																				1	1
Total	10	19	12	10	9	13	18	29	55	52	44	49	27	21	13	10	9	4	4	2	410

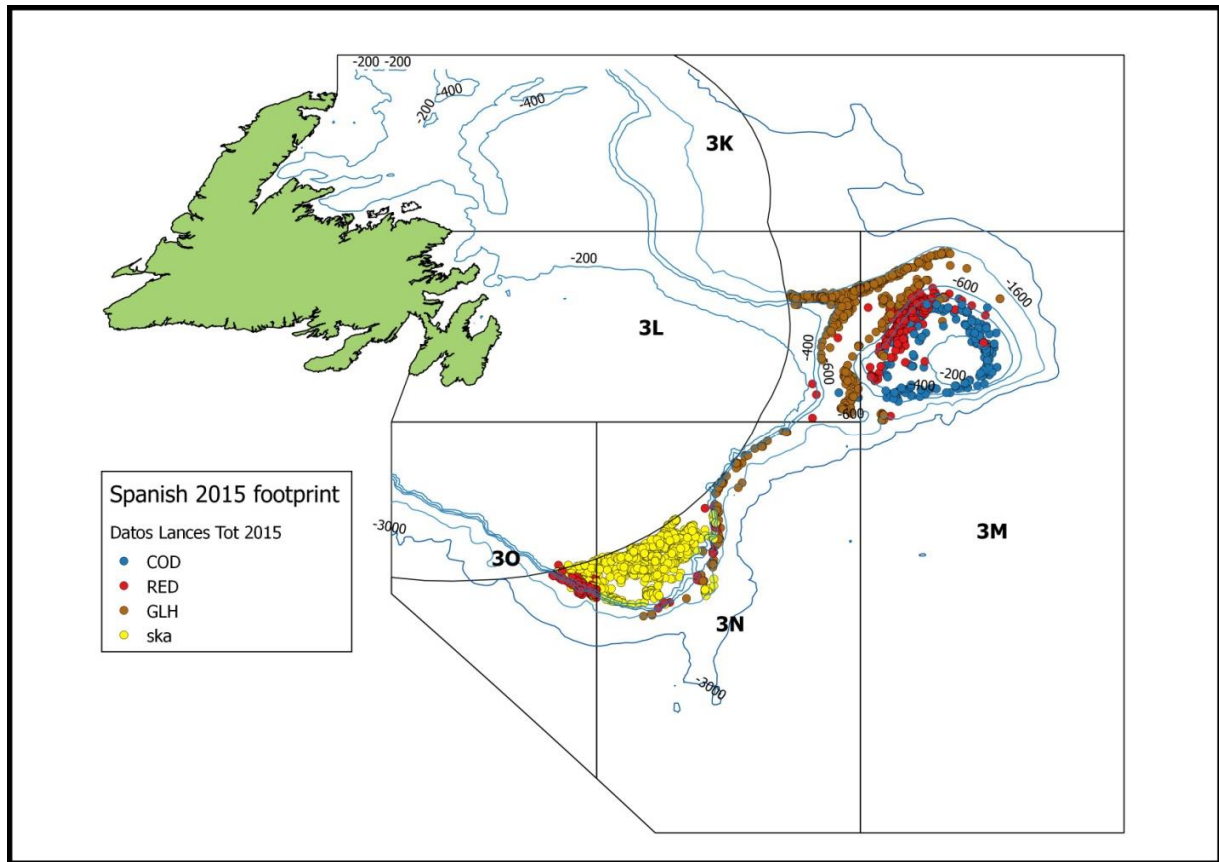


Fig. 1. Spanish Fishery 2015 footprint based in NAFO Observers data.

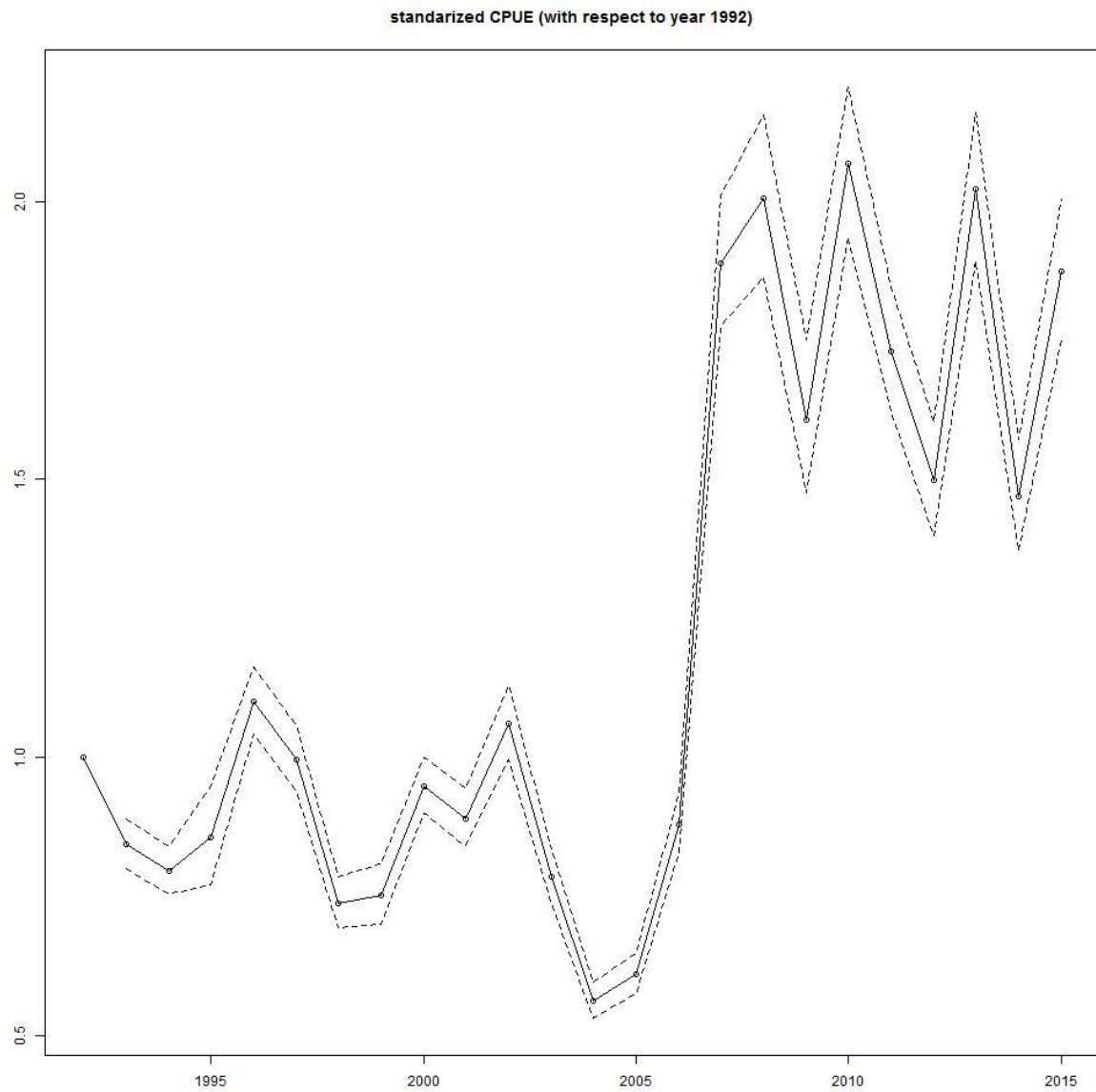


Fig. 2. Spanish fleet standardized CPUE with model presented by Gonzalez-Costas and Gonzalez-Troncoso (2009) update with the 2015 data.